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*THE REINSTATEMENT OF TELEOLOGY*

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The question about the whence and whither of the drift of our cosmic weather is an old one and cannot be lightly brushed aside. It is both a forced and a momentous issue. It is a forced issue, because we cannot help taking an attitude towards it, whether we make it explicit to ourselves or not. It is momentous, because such an attitude is a serious index of our deepest practical faith as regards the value of life, and cannot help determining our conduct. There have been three distinct types of theory in the past as regards this drift—Mechanism, Finalism, and Vitalism.

## I. THEORIES OF EVOLUTION

1. *Mechanism.* In considering mechanism, we must be careful not to be misled by the name, which is after all but a figure of speech. The view of the scientific naturalist of today has little in common with the mechanical theory of the eighteenth century. His interest, as must always be the case with science, is in efficient causes, and in so far he is not committed to any special type of metaphysics. He is but trying to discover the determining factors in the series of dynamic situations which occur in experience. As regards the constitution of these situations he is not necessarily an abstract atomist. It is true that the atomic hypothesis in chemistry and Mendel's theory of unit characters in biology have proved highly convenient in studying chemical and biological processes, but recent scientific research has shown that such an atomism, if taken in the abstract, breaks down. The Mendelian units, for example, are not effective as abstract elements. They figure within dynamic situations which they enable us to predict. Sometimes two unit-characters may figure as one for the purpose of prediction. In any case we must take account of the dynamic context in order to have satisfactory explanation.

This is equally true of other biological abstractions, such as sex determinants. They are, after all, abstractions, and only efficient in the situations in which they figure and which we cannot afford to ignore. The mechanical view, in the science of the present day, amounts to this, that in the case of life as well as in the inorganic world we must examine the chemical constitution of the process. We must analyze the dynamic situation into its chemical factors and their positional values. The effects of the presence and absence of these factors must be discovered, their quantitative variations in the situations under experimental control must be studied, and the effects of external conditions noted. There is no metaphysical short cut to an understanding of the process of life, any more than to an understanding of other dynamic processes.

As for the unique chemical compounds which pertain to living organisms, natural science, accepting them as facts as it accepts other actual compounds, is inclined to assume continuity as between the organic and inorganic, and to reduce the difference to one of complexity. The chemist's success in artificially producing "organic" substances in the laboratory—a success which has been ever increasing since the organic compound of urea was artificially produced a century or more ago—has stimulated the naturalist to believe that it may hereafter be possible to produce living protoplasm out of what we call inorganic elements, or at any rate that our failure to do so in the past is due to our ignorance and not to any inherent absurdity in the idea.

Now if the attitude of mechanism be understood in this naturalistic sense, nothing can be said against its procedure. Its results in successful prediction have been truly marvellous, considering the short time for which the method has been seriously tried. The revising of special hypotheses must be dictated by the facts, not by any *a priori* objections. Thus it is now generally recognized that the Darwinian hypothesis of natural selection, epoch-making as it was and useful as it still is, is only a partial account of the facts. Natural selection is a negative factor in evolution. As Driesch puts it, to regard natural selection "as a positive factor in descent would be to confound the sufficient reason for the non-existence of what is not with the sufficient reason of what is."<sup>1</sup>

<sup>1</sup> See *Journal of Philosophy, Psychology, and Scientific Method*, VII, 321.

The positive ground for variation and continuity must be found within the process.

The only question that can be raised as to the mechanistic hypothesis is whether it is adequate as an ultimate philosophy. Can this external and seemingly blind dynamism which appears in inorganic nature account for the direction of the process, and for the outcome as we find it in the higher stages of life? Can we read the whole history of the universe solely in terms of the categories which have proved so convenient on the simpler levels of existence? The postulate of continuity should apply, it would seem, as well when read from above down as when read from below up. And, after all, we have a much more intimate knowledge of processes and their implications in the highest stages, of which our will and ideals are a part, than we can ever possess of the dynamism of the lower stages of nature. In the former case we have a first-hand acquaintance with the inner transitions and unities; in the latter we are at best outside and speculative spectators.

2. *Finalism.* Finalism, as opposed to mechanism, has always taken the point of view that we must judge evolution by its outcome, its last stages. We know the potentialities of the acorn when we have seen it grow up as the oak, of the child when its capacities are displayed in the grown man. So we must know nature by its outcome in our own striving for ideals. Under the theory of mechanism, the process is accounted for by the factors discoverable in the previous stage of the sequence, together with the external conditions which play upon them; for finalism the causality lies in the future, in the prospective value of the process.

For working out this view we must go back to Plato and Aristotle as models. In opposition to the naturalistic method of their day, they insisted that evolution must be explained by its purpose, the idea, or form, to which it tends. The two Greek thinkers differ somewhat in details, but Plato must be regarded as the original master of this type of view.

For Plato the world of sense, the existence of which he does not deny, is but a poor effort to copy a world of eternal ideas. These alone are real. On this theory of a copy, Plato is driven to assume

that there are as many ideas not only as there are ideals and class-types, but as there are individuals and types of relations. This forces him eventually to regard mathematics as the type of the real, since only here can he find ideal possibilities adequate to the originals of the distorted shadows which make up the phenomenal world. With this phenomenal world Plato manifests a poetic impatience. He would not trouble himself with the mechanism of movement, so important to Aristotle. He would go directly to the end, which is the Good. Aristotle, while he largely copies his master, places more confidence in the world of actual process, in the potentialities of matter. The concrete process is the first reality. But this process finds its explanation in the conception of a goal to which it tends, its final cause. Here shows the artistic consciousness of the Greek; life and nature, too, work as the artist. In either of these views the end is conceived as the moving cause.

But obviously the end cannot be conceived to be consciously present in the case of the lower processes. How can they then develop in the direction of their characteristic activities? In other words, how can the form be effective? Since God is the goal and final cause of the movement of the universe, how does God act upon the world? Here Aristotle wavers between two methods. He sometimes speaks in quite mechanical terms. God gives a push from without to the outer circle of the universe, and thus makes it move. But the more characteristic method of Aristotle is to look upon God as self-contained activity and bliss, moving the world by his perfection. The beloved does not need to do anything to the lover; for the lover is moved by the beauty of the beloved. So the universe moves because it desires perfection. This perfection, moreover, is different for different classes; vegetable, animal, or human, each moves to realize its own proper function, its characteristic soul.

Hence it is necessary, in order to explain the diversity of the process, to assume in addition to God a multiplicity of forms,—entelechies, or conceptions. Just what relation these bear to the final form, God, Aristotle does not tell us; he takes them for granted from experience. His faith in the concrete process, however, gives him the advantage that he can regard the process

itself as really moving, and also that he can make this concrete process bear part of the responsibility. Thus the individuality of the process is due not to its form but to its matter. Hence forms are genera, not particulars. Here again his solution of the problem is tantalizingly vague. And naturally he has little to say about immortality, that is, the final significance of the individual.

A more serious question is why the process should desire the form. What relation do the conceptions, or entelechies, bear to the process itself? If they did not exist as second realities, would it make any difference to the process? Would not the process move by its own immanent tendency? In that case the conceptions, serving as final causes, would seem to be after-thoughts. But Aristotle is too anthropomorphic to be troubled by such questions; for him to the end it is the conceptions which move matter, although "only the master-workers know the reason why. Manual workers, like lifeless things, work by habit."

That there is truth in the finalist's contention we shall find abundant reason to see. But the solution suggested by Plato and Aristotle is far too easy and abstract. A biologist of the present day, Driesch, has attempted to give Aristotle's view a more modern and scientific statement. Driesch insists that we cannot account for the prospective value of the parts of protoplasm, as shown especially in restitution and heredity, unless we introduce entelechies. "An entelechy means the faculty of achieving '*forma essentialis*.'" Now these entelechies, while figuring in the process, are not on the one hand psychological entities, nor on the other are they energies. They can, however, be best understood from psychological analogies. They are selective. They perform functions which resemble judging and liking, willing and thinking. Yet, while they are not energies, they can under certain conditions suspend the energetic reactions; and they have a regulative function in the process. But while Driesch's attempt to get away from the anthropomorphism of Aristotle is commendable, it must be said that Aristotle's final causes are at least intelligible, being drawn from our experience of certain processes where they do hold. Driesch's entelechies seem to have no meaning at all; they are merely duplicates of the selective and

prospective tendencies of the process. Moreover, such a selective function is by no means limited to the organic realm; we find it, though with less complicated working, in the chemical affinities. In any case, it is hard to see what we have gained by hypostatizing such tendencies and giving them a Greek name.

3. *Vitalism.* Mechanism and classical finalism deal with partial aspects of the processes. Vitalism attempts to find a common denominator for the process as a whole.

Bergson and others have pointed out with great clearness that the correlative growth of organs and functions in organic life, for example in the eye, could not be accounted for by mere accidental variations and natural selection. If in any one part such variations were considerable and abrupt, as in the case of mutations, they would only interfere the more with the functioning of the organ. If they were small they might not interfere, but they would have to accumulate through ages, and correlative changes in this and other organs would have to take place, so as to produce harmonious adjustment or adaptive functioning. This is almost impossible to conceive on the basis of chance.

So with the different directions in which evolution has proceeded. These directions must be implied in the process, even though we can only read them backwards, as at sea we read the direction of the ship's movement from the silver wake where we have passed.

As between mechanism and conceptional finalism Bergson suggests the middle ground of *vital impulse*, in which is implied the complexity that afterwards appears when evolution splits up in the struggle with the environment, as the potential effects of the sky-rocket appear when it bursts in the air. The most important of these tendencies are the split of life into the vegetable and animal and the dissociation of mind into instinct and intelligence. Evolution is division. In the division, however, there remains a suggestion of the other side; some common characters, however secondary, abide. Plant-life carries a blend of the animal; intelligence, a blend of instinct. The progress and continuity of the process are to be accounted for by the push from behind of the common vital impulse.

Whether this vital impulse, as a distinct determinant in the

evolution of life, must be added to the chemical determinants with which naturalism deals, must be decided by scientific evidence. Once admit creative evolution in general, and recognize in particular that every compound must be regarded as a creative result, possessing a new and unique set of reactions, and not a mere addition of the separately known characters of the elements which enter into it, and the conceptual difficulty disappears. Whether, as externally viewed, life itself can be regarded as a compound, or whether, to produce in life some new factor must be supposed to have been added from without, must be decided upon evidence. At present the difficulties of conceiving that life was introduced from outside into our planet seem at least as great as those of the theory that it arose from certain antecedent conditions on our planet. In any case, we are dealing essentially with mechanism. Vital impulse, as pictured by Bergson, is no less blind than the elements of chemistry. Its structure, in order to account for all the diversity of life, must be no less atomic than science has pictured the physical structure to be. Moreover, synthesis would seem to be as characteristic of evolution as division; and if so, why may not life itself be regarded as a new synthesis, under specific conditions, in the creative process?

The trouble with the vital impulse is that, like any conception which tries to explain everything, it explains nothing. We still have the diversity of the process, with its direction, to account for. To say that what does happen can happen, is self-evident; and that is all that vitalism tells us. In trying to explain everything from below, the higher from the more primitive, it is pragmatically indistinguishable from the naturalistic mechanism which it condemns. The latter at least furnishes the only empirically fruitful method of investigating the apparent sequences of life. To account for the direction or meaning of the process we must have something besides a blind *vis a tergo*. What this means we must presently see more in detail.

It is at least infinitely improbable that mere chance or mere external conjunction, whether in terms of vitalism or of chemical mechanism, should have accomplished the results of organization, with the compensatory adjustments involved in the evolution of life and mind. There must be some continuity which



enables us to read down from the higher as well as read up from the lower.

It is also unlikely that *all* life is a compound having the potentiality of the development of the higher forms with their awakening ideals. It is easier to suppose that life, as Maxwell supposes in regard to matter, has its omniscient sorting demon who interpenetrates and selects in accordance with certain standards. In other words, the natural order must be thought of as interpenetrated by an intelligent order. Aristotle's failure to make form (in the sense of ideal conceptions) effective, and his recourse to mechanical push to move the universe, should show us that form, in order to be efficient, must dip into the dynamic process itself, whether in a personal or impersonal way. In the plastic responsiveness of the natural order to this, the unseen order, would in that case lie its capacity for progress. This plasticity becomes more and more apparent in the higher orders of life with their vast complexity of possibilities and their organization for action. The nervous system is peculiarly the type of plastic responsiveness both to the unseen order which overarches and permeates and to the sense-order which establishes the immediate conditions of survival.

## II. A NEW TELEOLOGY SUGGESTED

We have little sympathy today with Plato's "heavenly pattern" and Aristotle's "final causes," that is, with ideal conceptions as determining existence and survival. We are apt to think of the process of evolution as blindly accomplishing its course as a result of internal and external accidents. At best, some would say, it is only in retrospect that nature finds that some ways of doing things seem good and so strives to preserve them. Mind itself, with its ideals, some have come to treat in this retrospective way. And any emphasis on ideals has been promptly treated as an hypostasis of our own abstractions. Chance variation is regarded as the mother of mind and form, ideals are but indications of the drift, not its cause.

Even on this materialistic view, some use may be found for the "final form" of Aristotle. It represents, at any rate, the way

we look back upon the series after its conclusion. Ideals and types, as our measures, form *a posteriori* a convenient instrument for viewing the flux, and furnish a certain subjective satisfaction. But can we stop here? Is the type, the "final form," a mere result of accident? Could the direction of the organic process, or of social ideals, have been the opposite, if accident had so decreed? Is there no objective way of reading the series? Does it appear as it does simply because we happen to be at this end of it? And when life repeats itself, with seemingly new efforts to reproduce a type, is this sufficiently accounted for by accident? Could thought have been constituted entirely otherwise? Is the whole story of life, from the chaotic protoplasm from which it started to the striving for truth and beauty, all a matter of blind variations operated on by a blind environment?

However fully such a picture may do justice to our ignorance, it yet does not satisfy our reason. From the point of view of reason it is easier to read nature as striving to express certain types or ideals than to read ideals as chance. Nature seems to be, somehow, leading in the direction of human nature; the striving for a type somehow to be determining the direction of the series; and freedom and significant expression of life to be all the time the end to be realized.

I admit the difficulty of making this clear. But as a faith it ought to have at any rate the same opportunity as the materialistic faith in blind chance. If in our ignorance it makes the transitions of the facts easier for us, that gives it a pragmatic advantage over the more shocking rival faith. And I must confess that to me the conclusion of a process in the appreciation of truth and beauty is more reasonably accounted for in a universe which has a fundamental formal character and, as such, is selective than in a universe in which this idealization is an accident. On such reasonableness we may finally have to rest our mode of understanding the significance of evolution. Some may call this a mere temperamental preference. In that case the temperament remains to be accounted for. To me this seems like a fundamental demand for coherence and unity, while chance, formless happening, is fundamentally irrational—an apotheosis of our ignorance of the *modus operandi* of nature.

Whether the final cause operates through the inner yearning of the process for its type, its final realization, or whether the efficiency of the final cause means the operation in the universe of an ideal will, after the analogy of the artist, interpenetrating our finite world of process, selecting and rejecting with reference to the realization of the type—star type or man type—must again be decided by our experience, fragmentary as this is. Different ages and minds find one or the other of these attitudes more congenial. In any case the form would in some sense pre-exist in the process; and in any case evolution would mean the differentiation of the organs for the proper realization of this form and, in man at least, for the significant sharing of it.

The ultimate theory of evolution must include both mechanism and finalism. For the time being, in predicting and controlling the process, we must work by efficient causes. Science has no choice in this matter. On the other hand, we must admit that the ideal selection of the later stages has some continuity with the earlier stages. When we try to read the process in the large, at any rate, we must somehow recognize the direction within it. We may choose to ignore the final reason of things, and limit ourselves to the description of sequences; but it nevertheless remains true that in part of the process formal selection is a reality, and no fair account can be given of evolution without recognizing this part and its relation to the race. Invariable sequence, habit, recapitulation, and other external forms of linkage are but names for the facts. They merely indicate that facts do repeat themselves; they are not explanations. In some way the formal categories of which we become conscious in human nature must reveal to us the tendencies of nature; in some way the blossom on the tree of evolution must be indicative of the process which brought it into existence. The universe must be such as to account for the ideals which are a part of our experience as well as for the externality and blindness which we find. And as man in his small way, by his selection and emphasis of certain types of universe, is creative, so we must suppose that the process of which he is a part is likewise creative. This need not mean that the later stages are present bodily in the earlier, or that the earlier stages work by "conceptions," but it means that somehow the categories which

the later idealizing process brings to bear upon the earlier are germane to these earlier and not accidental.

Of the two conceptions, the mechanistic and the teleological, the latter is the one that overlaps. By means of laws familiar to us in the later purposive stages we can account for the automatism, the mechanism, the seeming deadness, of the world. By means of mechanism we cannot account for the seeming plasticity and value in parts of the process, at least not without falling back upon the miraculous, and so doing violence to our original concept. If we deny the reality of mind and ideals, we cannot account for the sense of promise of the world and of its openness toward the future, however convenient the conception of mechanism may be in epitomizing the past. In some way we must recognize emphasis and preferential selection, for human nature is part of nature.

That a universe should tend to realize a certain form is no more mysterious than that animals should turn toward or away from the light, or that the elements should attract or repel each other. In any case, in the last analysis we must fall back upon the constitution of reality as discovered in experience, and regard that as reasonable which works out. That a possibility of reasonableness should exist in a world which evolves reason seems certainly a reasonable demand.

It is the naturalistic materialist who has violated the principle of continuity in nature by cutting the higher stages of the process loose from the earlier. Why the materialist, who is always emphasizing continuity, should turn round when it comes to human nature and its ideals, and here insist upon discontinuity, a complete break, absolute irrelevance to what precedes, can be explained only as the result of prejudice. He had rather make any sacrifice than give up his faith in the adequacy of the mechanical method of reading the facts. If we would be fair, must we not insist that human nature, with the ideals which it brings to light, reveals truly and fundamentally the drift of nature? If we make nature responsible for evolution, then we must at any rate give nature full credit. We must keep in mind that thought, right, and beauty are as much expressions of nature as is the law of falling bodies. The whole history of evolution, including institutions,

science, and art, must be somehow prefigured in the nature of the universe as a whole. The after-form which we read in retrospect must somehow be foreshadowed in the process which terminates in it and which makes such reading possible. Consciousness but reveals, it does not make, the categories which guide mind in its higher activity.

Thus both the mechanical and the teleological categories must run through the various stages of evolution, however different their concrete richness and significance become with the varying complexity of the process. And this may be true irrespective of the stuff in which these categories express themselves. We have material mechanism and spiritual mechanism; and why not material teleology as well as spiritual teleology—just as the genius of the artist may express his meaning in marble, on canvas, in tones, or by means of words? The body is different, the limitations which the material sets are different, but the ideal laws are the same.

If we take even the categories of mechanism, we are most familiar with those which are expressed in terms of our own mental life, for memory and habit are categories of mechanism. As in the mechanical categories we can trace the identity between the higher processes of memory-association and the lower processes of perceptual habit and automatic activities, so we can trace the identity of the categories of external mental coherence with the categories of external coherence in the non-conscious world. Whether we use the term habit or some other term to indicate this universality of mechanism is a matter of convenience. If we cannot surely say, with C. S. Peirce, that matter is "mind hide-bound with habit," we can say that mechanism, in the sense of external determination, overlaps mind and matter, and has essentially the same categories in each.

On the analogy of memory, or rather by the use of categories which we must regard as identical and which are applicable both to the mechanism of memory and to the simpler forms of mechanism, we can account for, or at any rate throw light upon, processes which at first seem mysterious enough. In the case of memory, each part has by its position a certain function whereby it brings into the field of consciousness certain other parts. In other words,

the memory-mechanism is a constellation of mutually determining parts each able to restore other parts within the cluster. The mechanism is not absolute, there are minor fluctuations even in reproductive imagination; the situations are sufficiently identical for recognition with its feeling of familiarity, but new details have been added, old details have dropped out, and the tone of the situation may be greatly changed. In practical life we pass over these fluctuations as of no consequence to the process. In productive imagination, on the other hand, new types of universals are brought to light, which become permanent parts of our ideal activity.

In spite of the greater complexity of the process in the higher stages and the consciousness which accompanies it there, it is easy to see the fundamental identity of the operation of nature here with those operations which we find in the lower stages, such as heredity and the restitution (within greater or smaller limits) of parts. In each of these cases we have to do, whether in a material or mental way, with the positional value of a part within a constellation and its power to restore its context, whether this context be the space-context of a pattern of parts, simultaneously and mutually supplementing one another, or a time-context, where the parts blend into one another and constitute a sequential whole, as in the stages of the life of an organism or the movement of a melody. Some writers have called this positional potentiality of parts on the level of unconscious life organic memory. It is truer, however, to regard memory as a highly specialized form of the more universal tendency of reproduction of parts, with their fluctuations or mutations.

Thus it seems that certain mechanical categories are common to our minds and to the rest of reality. The preservation of a type, the tendency of one part to restore the rest of its complex, seems to be common to the mechanism of ideal and to that of lower activity. On the teleological side, too, we have reason to believe that there must be similar identity—elementary formal categories running through the process as a whole, whether inorganic, organic, or ideal selection—not limited to mind but present in some way, however unconscious, in the lower stages. There seems to be a tendency toward clearness and distinctness, toward

economy in relationships. That is why the fundamental postulate of simplicity has proved so convenient both in our theoretical and practical adjustments to our world.

That nature has, as it were, an aesthetic sense, that it operates so as to produce clearness and distinctness, is shown throughout its whole range of development. The inorganic world, as well as the organic, seems to respond to our ideal demands for simple formulation, for distinct types. Physical harmony follows the simplest ratios, as was pointed out by Helmholtz. The light rays move in straight lines, the chemical elements seem to fall into a "natural series," with relations that can be mathematically predicted. In the organic world nature likewise demands clearness and distinctness; the protean fluctuations fail to survive. Only the mutations, the distinct types, continue in heredity. Again, the mixture of species either gives rise to no offspring or produces sterility; or in the case of more approximate species a final reversion to the original type takes place in accordance with Mendel's law. Finally, in ideal creativeness and psychological heredity clearness and distinctness is the law. Here our conscious aim is to eliminate the irrelevant and make the type, or universal, stand out. Only the clear and distinct types succeed in becoming a permanent part of individual memory and social history. The infinite minor fluctuations come and go. We may therefore assume that the law which nature manifests in its highest creativeness and of which we are aware in our ideal production, namely, the law of clearness and distinctness, is identical with the law which governs nature throughout its various stages, and that the highest manifestations of this law differ from the lower primarily in the freedom and spontaneity with which the law realizes itself in the former. An immanent form in any case leads nature onward. While the law becomes conscious in the higher stages, it does not follow that it originates there. On the contrary it comes to our creative activity as a presupposition or command, as the voice of the universe.

This demand for clearness and distinctness in nature is seen even where there is mutation and instability. In a universal process the demand for clearness and distinctness necessarily

presents an infinite problem. In the case of the radio-active elements we seem to have such a case of mutation and instability in the natural series of elements. In the organic series periods of stability seem to alternate with periods of mutation. But in each case the spontaneity of nature illustrates the law or tendency which nature is ever striving to realize, and which is shown all the more strikingly because in places the process is still open and is striving for a new equilibrium.

Science, therefore, even of the most naturalistic kind postulates more than it knows, more than the blind mechanism with which it professes to work. It posits by its own faith and persistent effort, as it verifies by its success, that the universe must lend itself to ideals of simplicity and unity, that those laws which we discover for ourselves in the higher creative activities are relevant to our world, in brief that in a large sense the universe is fundamentally teleological. For us thus to strive to conquer the universe is part of the universe. The imperishable faith on the part of this piece of animated clay that, in spite of seeming defeat, it can yet make its demands prevail, that our will can in a measure reconstruct a world which shall be clear and distinct in its relationships in spite of seeming chaos—this faith is evidence of the voice of the universe, of its push toward ideal realization. By virtue of this, “hope springs eternal in the human breast.” This faith is more fundamentally pious than our shortcuts by way of an anthropomorphic God. The trouble with so much of our thinking, both of the mechanical and teleological type, is that it has been truncated. It lacks thoroughness.

Geometry, mathematical simplification, is but this faith in clearness and distinctness reduced to its ultimate terms. It is the idealizing process in the abstract, outstripping, as it comes to consciousness in us, its concrete limitations. And so form appears as limit to our finite experience; yet, when you bring back this faith to our motley world, how convenient it proves, how well our world lends itself to it, irrespective of stuff, so as to make it seem that the universe “geometrizes”! And in a deep sense it does; for both the seemingly opaque world we strive to know and our thought are part and parcel of one process; in their formal pre-suppositions they are one. Nature owns and moulds mind into



its own requirements. If the processes in the universe, from the stellar movements to the harmonic relations of music and the minute relations in the structure of things, seek geometrical and arithmetical patterns, this is not because our thinking regulates the processes, but because in the laws of our thinking we discover the pure manifestations of the inherent form, not obscured by the concrete transitions and changes of process.

That, again, our conceptualizing should prove approximate is inevitable in a moving world. In such a world form must ever manifest itself as tendency or direction—as an ought. Absolute our ideal formulations could only prove in a world which had completely settled or encrusted itself. But such a universe would be dead. Process, transmutation, creativeness, is of the nature of reality and must be accepted as such. That nature is creative and not merely reproductive of ready-made universals is shown both on the plane of the unconscious origination of the lower levels of nature and on the plane of ideal creativeness. Organically, nature is ever creating and fixing new types; and in our ideal constructions this is no less true. If on the organic level nature is prodigal in her experiment, she is no less prodigal on the ideal level. How few poems, pictures, laws, practical plans, out of the myriads evolved, answer the permanent ideal demands of the race!

If nature stands in relation to its processes as an artist attempting to express a form—a form not foreign to itself but its own implicit or explicit constitution—then we must regard natural selection and artificial selection as part of the same activity, differing only in their degree of conscious direction and significance. The latter is itself a result of the demand for clearness and distinctness of functioning on the part of nature. In natural selection this formal demand realizes itself automatically in the flux of process. Just as the stone rolls back again to the bottom unless it reaches the top of the hill, so life tumbles back to the inchoate plane from which it tried to rise unless it reaches a clear and distinct type. On the level of thought, however, where nature is more or less clearly conscious of her aim, the process of so-called “artificial” selection is far more economical and efficient. Not only can ages of unconscious experimenting be

foreshortened, but results of clearness and distinctness can be attained which blind groping never could reach. And with it all, there is added, on this plane, the consciousness of value with its infinite richness.

It is not a case of natural laws in the spiritual world or of spiritual laws in the natural world, but of certain laws prevailing throughout the process of the universe, expressing themselves in the limitations of each particular stage and stuff in which they operate, just as the categories of art are fundamentally the same whether the stuff be marble, tone, or the body of language. What makes the law in each case clear is the interpenetration of the same identical form. The various energies are fundamentally run through with the same categories. It is a case of our reasonable reading of our world.

Two questions yet remain, namely, the character of this formal constitution and the question of its effectiveness in our world of process. Before taking up these questions, it is necessary to say a word about the internal conditions governing the continuity of process. For the present purpose, the elementary facts in the constitution of process may be considered as three: (1) the fluency of process, which makes it overflow our abstract types, producing ever new fluctuations and mutations; (2) the mechanical aspect of process which makes its flow crystallize, provisionally at least, into certain structures, making it possible to predict and control its flow; (3) the formal requirements which condition the direction and intelligibility of the process.

Coming back to our first question, How do forms pre-exist, or what forms are presupposed? I do not believe that it is necessary to assume an indefinite number of forms as do Plato and Aristotle. True, Aristotle limited the forms to class-forms and depended upon the concrete process to differentiate these into individuals. I would make the formal requirements still more general—the same for the process as a whole. These formal requirements, as I have shown, can be reduced in the last analysis to the demand for clearness and distinctness as regards the transitions and relations within the process. Variations, smaller or larger are ever produced; they tend to crystallize—to be retained and to reproduce their contexts by virtue of the inherent mechan-

ism of process. But they survive in the process, so far as internal conditions are concerned, only if they fulfil the formal requirements of clearness and distinctness. Neither the types nor the individuals are predetermined as such. But when in the course of the transmutations they do arise, they must, in order to survive, obey certain formal laws—laws which are also fundamental in our understanding and appreciation of our world.

Of course, besides the internal conditions of survival, there are the external conditions which fix what types can survive in the particular environment, simple or complex, low or high, as it may be. But these can only eliminate, they cannot make types permanent.

These external conditions cannot be conceived in merely material terms. There is more than one level of environment. If we take into account merely the simplest environment, the micro-organisms are better adapted to it than we are. They were here before us, and will remain for ages after the earth becomes uninhabitable for the higher forms of life. Some of them are adapted to withstand the temperature of liquid air.

There seem to be certain plateaus, levels or crusts of life, more or less rhythmically formed. These have their own unique conditions for survival. In social life we have certain levels in the way of custom and tradition; then there comes a loosening of the crust and a period of agitation and rearrangement. This in turn is followed by a new level of equilibrium with new selective conditions for the individual. The same seems to be true of life on the organic level. Here, too, periods of stability of species are found to alternate with periods of mutation. And thus new levels are reached with new external conditions for survival.

As regards the effectiveness of form, Plato and Aristotle have shown that in higher ideal realization it is not necessary that the form should itself move in order to produce movement, that is, that the form should possess energy. The beloved may be indifferent to the lover. Beauty moves us by its perfection, not by its sensuous body. What is true in the higher activities may be true of the lower. Substituting energy or tendency for love, we may say that energy seeks a geometrical or arithmetical pattern, seeks simplicity of relationships, though the limits

which it seeks do not act upon it. They are in fact part of its constitution. The laws of logic do not act upon the process of thought. They are implied in it. And thought is but nature's reflection upon itself.

### III. MATTER AND GOD

In closing, something must be said about the metaphysical nature of the world in which form is realized. There has been in recent times much sentimental inveighing against the meanness and blindness of matter. Now that depends primarily upon definition. With some noble, rugged materialists the conception of matter is decidedly thick—rich in possibilities. Democritus, Hobbes, and Priestley deny nothing to matter that could make the world plausible. They attribute to matter all the pragmatic consequences with which experience makes us acquainted, including mind and ideals. With Democritus, while mind is reduced to fire-atoms, it loses nothing of its efficacy and dignity on that account. For Hobbes, consciousness itself is a property of matter and so not foreign to the world. Priestley's materialistic hypothesis does not interfere with his religious devoutness. The great prophets of Israel, who gave us our fundamental ethical and religious ideals, thought of the world, including the human soul—"the breath" of man, in material terms. With all these, matter covers the whole range of potentialities from inorganic nature to a deistic God. Tyndall could not cease to marvel at the potentialities of matter. When we should understand them, all would be clear. With this thick conception of matter, teleological idealism need not have any quarrel. Matter rises to any emergency, since the conception can be enlarged to meet the case. It would be principally a question of convenience whether we should use such a concept.

The tendency, however, has not been absent to narrow the conception of matter to the anti-teleological, or mechanical, interest, and thus to contrast matter with mind—which under such a view becomes a sort of miraculous accident. Such a conception still leaves much to admire; the body with its delicate adjustments and intricacies shows wondrous possibilities even when

contrasted with mind. Even the pale nobility of the face of a dead friend challenges our reverence by its wonderful expressiveness. The trouble with the mechanical conception is not so much its ignobility as its narrowness—its failure to take stock of all the facts, to furnish play for all the possibilities of life.

If we use matter in this narrower sense, as opposed to mind, what is the function of matter in the process of evolution? Those who have attempted to give a monistic, idealistic view of the world, in whatever form, have eventually been brought face to face with the problem of that upon which mind impinges, the non-teleological stuff against which our purposes seem to beat, and in struggling with which they discover themselves. If Plato insists that only the Good is ultimately real, and all else imitation and non-being, yet he has to recognize a reality at least in the limitations which the struggling elements of our mundane sphere set to our purposive striving. If the elements but reflect the eternal beauty, they also distort it. If Aristotle finds in matter the potential, yet it is not passively potential. It has an order of its own which may run counter to the purposive order. The Platonic dualism meets us again in Hegel's spatializing of the category of the spirit and its estrangement in its lapse to unconscious otherness. As Aristotle's potential, it meets us in Fichte's struggle of the ego with the irrational surd of our nature, while Schelling would make the physical energies merely lower categories in the history of spirit as it struggles toward its conscious awakening. Bergson would make matter the inverse of reality—the intellectual spatializing and degradation of a reality which is essentially a psychic stream of growing, blending, interpenetrating life-impulses. But, nevertheless, he has to acknowledge that it is somehow in the struggle with matter, in order to mould itself to its constitution, to maintain itself under its conditions, that life explodes like a shell into its inherent tendencies. In some sense, then, the reality of matter, as having a part in the realization of life, has had to be recognized even by those who have categorically declared its non-existence.

In giving an adequate account of mechanical matter as an external condition and instrument in the evolution of life, a pluralistic conception of the world has a decided advantage over the

monistic. It is not forced to smuggle in through the back-door what it has cast out through the front-door. It is free to follow the lead of experience in recognizing different types of reality. Among these are the physical types which, on the one hand, through their own structure and laws set definite conditions for the survival of life, and, on the other hand, furnish the intellect with the instruments by which life becomes liberated from slavery to the immediate present.

Even in dealing with the physical world, where mechanical conceptions have so long reigned supreme in our theorizing, it has become more and more clear that mechanism alone, convenient as it is within certain limits, is inadequate as a final philosophy. So far as the naturalistic aspect of the world is concerned, it would seem that the available energy must continually run down as the streams run into the sea, that heat must reach more and more a condition of equal distribution according to Carnot's law, and that the universe must eventually become stark still, or rather would have had to become so infinite ages ago. That this law has not thus operated must be due to the fact that mechanism is somehow a part of a larger constitution which is fundamentally teleological and in which life and mind are fundamental categories. Even to explain the activities of matter we find it convenient to think of it as somehow interpenetrated by intelligence; Maxwell's sorting omniscience keeps the universe from running down to a dead level.

On the other hand, I cannot feel that merely reducing the universe to metaphysical mind-stuff, as in the various types of panpsychism, necessarily ennobles life. The world is neither better nor worse for our metaphysical conceptions. And if panpsychism is indifferent to the realization of ideals, if it reduces the higher to the lower categories, if it fails to give us a preferential basis of values, if it offers no call to our creative abilities, it is teleologically indistinguishable from the crassest type of materialism. This is the logic of the fact that so many "Hegelians of the left" completely faced about from absolute idealism to absolute materialism, or rather found that the former, as impersonally conceived, was equivalent to the latter. The mere reduction of the stuff

of the universe to the type of mind-stuff is not sufficient to guarantee its value. The lowest things, as well as the highest, that we know in our experience are mental. The most degrading lusts are as much mental as the highest aspirations. Mind covers the whole range of value from heaven to hell.

The pragmatic difference in metaphysical conceptions for our ideals lies not in the stuff of our conceptions but in their friendliness to what we feel to be our higher nature, the re-enforcement of what we feel to be the best part of the universe, our ideal demands.

We must not be misled by mere words. We must recognize that pragmatically we have dynamic situations with their variations and their tendency toward types, whatever the metaphysical stuff may be. It is a mistake to suppose that by adopting more euphonious terms for these situations, such as "vital impulse" or "panpsychism," we have either explained or dignified the process. As general metaphysical entities they do not alter the problem of continuity and evolution one whit, though they may be more congenial to our imagination. The problem in any case remains for science to discover for our practical purposes of description and prediction the determining factors in the process, and for epistemology to discover the immanent categories which enable us to read the process with clearness and distinctness. We must conceive a world which makes our minds feel at home. Teleologically, it makes no difference whether we call the universe matter or spirit, if we only realize that it is such as eventually to demand and enforce ideals. This is its ultimate promise or potentiality. What name we give to reality does not matter so long as its properties, its pragmatic outcomes, are the same, so long as it can think and appreciate and furnish the object of our hopes; so long as it blossoms out into a sense for beauty, a demand for right, a worship of the ideal. It is true in any case that the universe makes us for itself, to express itself.

Our direct acquaintance with the effectiveness of form is limited to the operation of mind and to this in its higher ideal striving. When we try to imagine formal selection in the universe at large, it is at any rate easier to picture such selection to ourselves if we think of a greater and better mind interpenetrating the various

stages of the process with intelligent interest, re-enforcing the formal demands of the process and eliminating failures.

Even if the conception of an abstract, immanent form should satisfy our purely logical and aesthetic demands upon the universe, our ethical and religious needs would still call for an interpenetrating and overarching personal constitution which works for righteousness and beauty, which is sympathetically concerned in ideal realization, which in short makes warm and living the formal constitution of the process. We think of God as the master-mind, interpenetrating our minds and nature and, in a manner which we can but faintly grasp, guiding to a meaningful issue.

To be omnipresent and universally effective, this mind need not be the whole of things. Heat and gravitation are present throughout the physical world, but they are not the whole of the world. Take social history,—a great personality like Jesus may permeate history and make it converge toward him, may stamp and control history, and yet not be all of history.

Of this larger regulative and compensating universal constitution it must indeed seem that it does a wholesale rather than a retail business. This would indeed be deadening to our ethical and religious consciousness, except for the other analogy derived from our own organic economy, namely, that the regular adjustments become automatically purposive. So the wholesale operations of the universe require no attention. Maxwell's sorting demon can do his work automatically. Mechanism can take over the work of intelligence. It is only the retail unique relations which require interest. This leaves mind, in its higher reaches, free to deal with the rarer personal aspects of the situation, the spots where, by virtue of spontaneity and complexity, free and rational creativeness operates. And if even here personal interest or sympathy seems appalling, we must remember that the mind of minds is not bounded by our narrow limitations of space and time, but is capable of an infinitely larger field of interest. We may also imagine that the occasions for sharing in this larger life lie in us—this supra-finite life lying ever at our subliminal or supraliminal door, ever interpenetrating and overlapping as gravitation overlaps, ever waiting, and ever welcoming, the proper organization and due awakening in us for its powers to be realized, as



light awaits the organization of an eye for its beauty of color to appear. Thus pluralism, and pluralism alone, with its conception of growth and organization of centres and their mutual and cosmic interpenetration, fills the need of the religious demands of life.

As, moreover, our finite minds can interpenetrate and mould various types of stuff into the unity of ideals, so the master-mind may interpenetrate the variety of the processes of nature, even though they are not mind. The statue can express ideals even if it is not mind-stuff. We may thus have teleological unity with variety of stuff and stages of development. We may in closing adopt the language of Emerson, even though we must conceive our relation to the Master-mind as more concrete and intimate than that implied in the Oversoul: "We live in succession, in division, in particles. Meantime within man is the soul of the whole, the wise silence, the universal beauty to which every part and particle is related, the eternal one."